CATALOG DOCUMENTATION
MAIA-ESTUARIES SUMMARY DATABASE
1997 and 1998 STATIONS
BENTHIC BIOMASS DATA: “BEN_BIOM”

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1. DATASET IDENTIFICATION

1.1 Title of Catalog document
MAIA-Estuaries Summary Database
1997 and 1998 Stations
Benthic Biomass Data

1.2 Authors of the Catalog entry
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1.3 Catalog revision date
April 30, 2000

1.4 Dataset name
BEN_BIOM

1.5 Task Group
MAIA Estuaries

1.6 Dataset identification code
010

1.7 Version
001

1.8 Request for Acknowledgment and Suggested Citation
EMAP requests that all individuals who download EMAP data acknowledge the source of these data in any reports, papers, or presentations. If you publish these data, please include a statement similar to: "Some or all of the data described in this article were produced by the U. S. Environmental Protection Agency through its Environmental Monitoring and Assessment Program (EMAP)”.

2. INVESTIGATOR INFORMATION (for full addresses see Section 13)

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3. DATASET ABSTRACT

3.1 Abstract of the Dataset
The BEN_BIOM file reports the biomass of benthic species found in grab samples collected in MAIA estuaries during the Summer of 1997 at a station (no biomass data were measured for samples collected in 1998). One record is presented for each taxon in a grab sample. One record is presented for each taxon per grab at a station. Each record includes the taxonomic name that was assigned by the partner responsible for the analysis (TAX_DSCR), and an additional codename (TAXNCODE) assigned to provide consistency despite different naming conventions employed by partners. The biomass of each taxa is reported, as well as a parameter that specifies the taxonomic level represented by the record, *i.e.*, species, genus, family, ***etc***, and the number of grabs collected at a site (one, two, or three).

3.2 Keywords for the Dataset
Benthic species, invertebrates, community structure, biomass per taxon per grab, epifaunal, infaunal, ash-free dry weight

4. OBJECTIVES AND INTRODUCTION

4.1 Program Objective
The main objectives of the MAIA-Estuaries program are: (1) to evaluate the ecological condition of the Mid-Atlantic estuaries by measuring key properties of the water, sediment, and the community of organisms; (2) to focus attention on small estuaries in order to develop better monitoring approaches for these critical systems; and (3) to develop partnerships among federal and state environmental organizations.

The Environmental Monitoring and Assessment Program (EMAP) is an EPA research and monitoring program designed to provide unbiased assessments of the condition of selected resources over a wide region. A key feature of the program is a probabilistic sampling strategy that randomly selects sampling sites and assigns weighting factors based on area to all measured results. EMAP's strategy was adopted by the Mid-Atlantic Integrated Assessment (MAIA) program,

which was designed to assess the conditions of the estuaries, forests, streams and lakes, and agricultural lands in the eight-state Mid-Atlantic region. This file contains data measured in MAIA estuaries during the Summers of 1997 and 1998. Samples were collected for water and sediment analyses primarily in 1997, with a few additional sites sampled in 1998. Fish samples were collected only in 1998. Several estuaries were designated as intensive sites and were sampled in greater detail (see STATIONS file).

The partners in MAIA-Estuaries program are: (1) The U.S. Environmental Protection Agency (USEPA), including both the Atlantic Ecology Division (AED) and the Gulf Ecology Division (GED); (2) National Park Service (NPS) under their project "Maryland Coastal Bays Monitoring"; (3) National Oceanographic and Atmospheric Administration (NOAA) which conducted sampling both in the Delaware Bay (DB) under their "National Status and Trends Program" and in the Carolinian Province (CP); and (4) The Chesapeake Bay Program (CBP), which is a consortium of federal, state, and local governments and nongovernmental organizations. Each partner was responsible for collecting, processing, and reviewing data. The USEPA Atlantic Ecology Division was responsible for final assembly and review of all data. Laboratories contracted to process samples are specified by the parameter LABCODE included in all data files (Section 4.4). Details regarding use of partner and LABCODE information are presented in the EVENTS metadata file.

4.2 Dataset Objective

The biomass of the benthic organisms are reported for each grab sample collected in 1997.

4.3 Dataset Background Discussion

Benthic invertebrates constitute the largest living reservoir of organic carbon in many estuarine systems. Most of the organisms are secondary consumers in the estuarine food web, and in turn are prey for fish and other organisms. They are generally long-lived, relatively immobile, and are believed to be sensitive to stresses such as alteration of habitat, exposure to toxic substances and low-oxygen conditions, ***etc.*** For these reasons, monitoring programs often collect information about the identity, abundance and biomass of benthic organisms. Such data are used to develop indices of abundance and diversity which help characterize the ecological condition of an estuary.

Only the biomass data are reported in this file; identity and abundance data are reported in the BEN_ABUN file. Note several features of these data files:

(1) At about half the stations, a single grab sample was. At the remaining stations, either two or three grab samples were processed. Care should therefore be taken when calculating and comparing indices that are affected by the number of grab samples taken at a site, ***e.g.***, abundance or richness indices. The parameter BENGRAB identifies the grab sample associated with the record (either 1, 2, or 3), and is reported consistently in the BEN_ABUN, BEN_BIOM , and BENGRAIN data files.

(2) Three parameters contain information about the identity of the organism: (*i*) TAX_DSCR is the taxonomic name as provided by the partner conducting the survey. Occasionally, the name may differ from the standard Latin name recognized by taxonomist because of slightly different naming conventions used by the partners, or because of misspellings, the incorporation of descriptive information, ***etc***. These names are retained in this file as a connection to the original databases. (*ii*) TAXNCODE is a eight-character codename for the taxon identified in the record. The codenames are consistent among partners and provide an informed best-guess in the case of ambiguous assignments. Use this name rather than TAX_DSCR when analyzing abundance and biomass data. The proper Latin name associated with the codename is listed in a separate data file BEN_TAXA.

4.4 Summary of Dataset Parameters

*STATION	Station name
*EVNTDATE	Event date
*BENGRAB	Identifier for grab sample at a station. Either 1, 2, or 3 grabs were collected at a site. This parameter identifies the specific grab sample associated with a taxon.
*TAXNCODE	Codename assigned to each taxon to minimize variations in names arising from different naming conventions employed by partners. There is a one-to-one correspondence between the codename and the proper Latin name, as is listed in the BEN_TAXA file.
BIOMASS	Ash-free dry weight (g) of a taxon per grab, calculated using all available individuals of a taxon in a grab.
BM_ABUND	The number of individuals contributing to the biomass calculation.
TAX_DSCR	Name of taxon as reported by partner conducting survey. The name may contain descriptive phrases in addition to a Latin name, and naming conventions vary slightly among partners.
LABCODE	A code identifying the partner or contract responsible for analyzing samples BEN-1 USEPA contractor: Versar, Inc. BEN-3 Chesapeake Bay Program contractor: Versar, Inc. BEN-4 NOAA Delaware Bay contractor
QACODE	QA/QC codes <blank> No qualification
YEAR	Year of Sampling: 1997 only in this file

* denotes parameters that should be used as key fields when merging data files

5. DATA ACQUISITION AND PROCESSING METHODS

5.1 Data Acquisition

The sample collection methods used by USEPA field crews will be described here. Any significant variations by other MAIA partners are noted in Section 5.1.12. Details regarding MAIA partners are reported in the EVENTS data file.

5.1.1 Sampling Objective

Benthic grab samples were collected for the identification and enumeration of benthic organisms and subsequent determination of ash-free dry weight (biomass) and grain size.

5.1.2 Sample Collection: Methods Summary

One to three replicate grab samples were collected from each station using a Young-modified Van Veen grab sampler. Each replicate grab was assigned an identification number (1, 2, or 3) that is reported as the BENGRAB parameter in this and other data files. The grabs were nominally 440 cm^2 in area and 10 cm deep. A sub-sample 2.5 cm in diameter and the depth of the grab was taken from each grab for grain-size analysis. The remaining sediments were live-sieved in the field with a 0.5 mm mesh screen. Organisms retained on the screen were placed in plastic containers and fixed in 10% buffered formalin with rose bengal stain for preservation.

5.1.3 Beginning Sampling Dates

8 July 1997

5.1.4 Ending Sampling Dates

8 October 1997

5.1.5 Sampling Platform

Samples were collected from gasoline or diesel powered boats, 18 to 133 feet in length

5.1.6 Sampling Equipment

A 1/25 m2, stainless steel (coated with Kynar), Young-modified Van Veen grab sampler was used to collect sediments

5.1.7 Manufacturer of Sampling Equipment

Young's Welding, Sandwich, MA.

5.1.8 Key Variables

Not applicable

5.1.9 Sample Collection: Calibration

The sampling gear does not require any calibration, although it was inspected regularly for damage by mishandling or impact on rocky substrates

5.1.10 Sample Collection: Quality Control

Care was taken to minimize disturbance to the sediment grabs. Grabs that were incomplete, slumped, less than 7 cm in depth, or comprised chiefly of shelly substrates were discarded. The chance of sampling the same location was minimized by repositioning the boat (five meters downstream) after three sampling attempts.

5.1.11 Sample Collection: References

Strobel, C.J. 1998. Environmental Monitoring and Assessment Program - Mid-Atlantic Integrated Assessment. Estuaries Component, Field Operations and Safety Manual. U.S. EPA, Office of Research and Development, NHEERL-AED, Narragansett, RI. July, 1998.

Kokkinakis, S.A., J.L. Hyland, and A. Robertson. 1994. Carolinian Demonstration Project - 1994 Field Operations Manual. Joint National Status and Trends/Environmental Monitoring and Assessment Program. NOAA/NOS/ORCA, Silver Spring, MD.

5.1.12 Sample Collection: Alternate Methods

Not applicable

5.2 Data Preparation and Sample Processing

The processing methods used by USEPA contracts will be described here (LABCODE = BEN-1). Any significant variations by other MAIA partners are noted in Section 5.2.6.

5.2.1 Sample Processing Objective

To measure the dry weight of taxa found in a grab sample in MAIA estuarine sediments.

5.2.2 Sample Processing: Methods Summary

All taxa in a grab sample were sorted by a technician and then identified and counted by a skilled taxonomist. Either 1, 2, or 3 grabs were collected at a station, and each grab was processed separately. Only organisms larger than 0.5 mm were processed; therefore groups such as turbellarian flatworms, nematodes, ostracods, harpacticoid copepods and foraminifera were excluded from the identification process. Because of complexities involved with precise identification, the following groups of organisms were routinely identified to the indicated taxonomic level: anthozoa (class), chironomidae (family), hirudinea (class), nemertinea (phylum), oligochaeta (class), ostracoda (subclass), sipuncula (phylum), turbellaria (class), and copepoda (order). Occasionally, the taxonomist amended the Latin name with descriptive phrases such as "complex", "group", "with capiliform chaetae", *etc.* These original names are

reported in the parameter TAX_DSCR. To provide consistency among partners, a codename (TAXNCODE) was assigned to the records, using best judgement in ambiguous cases. The standard Latin names and ISTN codes associated with the TAXNCODEs are contained in the file BEN_TAXA. The ash-free dry weight biomass was determined for each taxon identified in a grab sample. Biomass is calculated as the dry weight (g) of all specimens of a taxon in a grab sample, following dehydration at 60 C and combustion in an ash oven at 500 C for 5 hr. Selected specimens from some samples were archived to create a taxonomic reference collection, and were therefore not included in the biomass measurement. The actual number of individuals contributing to the biomass determination is reported in the parameter BM_ABUND. Note that Oligocheate worms and chironomid larvae were each pooled to generate biomass values representative of organisms at the taxonomic 'group' level.

5.2.3 Sample Processing: Calibration
Not applicable

5.2.4 Sample Processing: Quality Control
A minimum of 10% of all samples were reweighed to evaluate the repeatability of measurements. Blanks were processed with batches of samples as a check for contamination.

5.2.5 Sample Processing: References
U.S. EPA. 1995. Environmental Monitoring and Assessment Program (EMAP): Laboratory Methods Manual-Estuaries, Volume 1: Biological and Physical Analyses. Narragansett (RI): U.S. Environmental Protection Agency, Office of Research and Development, EPA/620/R-95/008.

Ranasinghe, J.A., L.C. Scott, and F.S. Kelley. 1997. Chesapeake Bay Water Quality Program, Long-term Benthic Monitoring and Assessment Component. Level I Comprehensive Report. July 1984 - December 1996. Prepared for the Maryland Department of Natural Resources, Resource Assessment Service, Tidewater Ecosystem Assessments by Versar, Inc., Columbia, MD.

5.2.6 Sample Processing: Alternate Methods
Not applicable

6. DATA ANALYSIS AND MANIPULATIONS

6.1 Name of New or Modified Values
Not applicable

6.2 Data Manipulation: Description
Not applicable

7. DATA DESCRIPTION

7.1 Description of Parameters

7.1.1 Components of the Dataset

VARIABLE	TYPE	LENGTH	LABEL
STATION	Char	10	Station name
EVNTDATE	Num	8	Event date

7.1.1 Components of the Dataset, continued

VARIABLE	TYPE	LENGTH	LABEL
BENGRAB	Num	8	Identifier for replicate ‘‘grabs’’ at a station
TAXNCODE	Char	8	Taxon code name
BIOMASS	Num	8	Species Ash Free Dry Wt in Sample (g)
BM_ABUND	Num	8	Abundance Contributing to Biomass
TAX_DSCR	Char	50	Taxon Latin name
LABCODE	Char	5	Contract/Lab identifier
QACODE	Char	10	QA/QC code
YEAR	Num	4	Year of Sampling

7.1.2 Precision of Reported Values

BENGRAB	whole numbers
BIOMASS	0.0001 g (but no more than three significant digits)
BM_ABUND	whole numbers

7.1.3 Minimum Value in Dataset

BENGRAB	1 grab
BIOMASS	0.000 g
BM_ABUND	0 individuals

7.1.4 Maximum Value in Dataset

BENGRAB	3 grabs
BIOMASS	10.8 g
BM_ABUND	3412 individuals

7.2 Data Record Example

7.2.1 Column Names for Example Records

STATION EVNTDATE BENGRAB TAXNCODE BIOMASS
BM_ABUND TAX_DSCR LABCODE QACODE YEAR

7.2.2 Example Data Records

STATION	EVNTDATE	BENGRAB	TAXNCODE	BIOMASS
MA97-0001	8/25/97	1	ACTECANA	0.0001
MA97-0001	8/25/97	1	ANTHOZOA	0.0002
MA97-0001	8/25/97	1	CAPICAPI	0.0018
MA97-0001	8/25/97	2	HETEFILI	0.0096
MA97-0001	8/25/97	1	MERCMERC	0.0001

BM_ABUND	TAX_DSCR	LABCODE	QACODE	YEAR
1	Acteocina canaliculata	.	BEN-1	1997
1	Anthozoa	.	BEN-1	1997
34	Capitella capitata complex	.	BEN-1	1997
5	Heteromastus filiformis	.	BEN-1	1997
2	Mercenaria mercenaria	.	BEN-1	1997

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude (Westernmost)
-77.4339 decimal degrees

8.2 Maximum Longitude (Easternmost)
-74.7230 decimal degrees

8.3 Minimum Latitude (Southernmost)
34.9670 decimal degrees

8.4 Maximum Latitude (Northernmost)
40.1470 decimal degrees

8.5 Name of area or region
MAIA estuary region, consisting of Delaware Bay, Chesapeake Bay, the Delmarva coastal bays, Albemarle-Pamlico Sound, and contiguous estuaries.

9. QUALITY CONTROL AND QUALITY ASSURANCE

9.1 Measurement Quality Objectives
No criteria for accuracy or precision are specified for this parameter

9.2 Data Quality Assurance Procedures
The data were reviewed to assure consistency among partners regarding sampling procedures, reporting format, *etc*.

9.3 Actual Measurement Quality
Not applicable

10. DATA ACCESS

10.1 Data Access Procedures
Data can be downloaded from the web

10.2 Data Access Restrictions
None

10.3 Data Access Contact Persons
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10.4 Dataset Format
ASCII (CSV) and SAS Export files

10.5 Information Concerning Anonymous FTP
Not available

10.6 Information Concerning WWW
See Section 10.1 for WWW access

10.7 EMAP CD-ROM Containing the Dataset
Data not available on CD-ROM

11. REFERENCES

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Texas A & M University, Geochemical and Environmental Research Group. 1990. NOAA Status and Trends, Mussel Watch Program, Analytical Methods. Submitted to NOAA. Rockville (MD): U.S. Dept. of Commerce, National Oceanic & Atmospheric Administration, Ocean Assessment Division.

U.S. EPA. 1995. Environmental Monitoring and Assessment Program (EMAP): Laboratory Methods Manual-Estuaries, Volume 1: Biological and Physical Analyses. U.S. Environmental Protection Agency, Office of Research and Development, Narragansett, RI. EPA/620/R-95/008.

Valente, R. and Strobel, C.J. 1993. Environmental Monitoring and Assessment Program- Estuaries: 1993 Virginian Province Quality Assurance Project Plan. U.S. EPA,NHEERL-AED, Narragansett, RI. May 1993

Weston, D.P. 1988. Macrobenthos-sediment relationships on the continental shelf off Cape Hatteras, North Carolina. Contin. Shelf Res. 8:267-286.

12. TABLE OF ACRONYMS

AED	Atlantic Ecology Division
CP	Carolinian Province
CBP	Chesapeake Bay Program
DB	Delaware Bay
EMAP	Environmental Monitoring and Assessment Program
EPA	U.S. Environmental Protection Agency
GED	Gulf Ecology Division

12. TABLE OF ACRONYMS, continued

GERG	Geochemical and Environmental Research Group
MAIA	Mid-Atlantic Integrated Assessment
NHEERL	National Health and Environmental Effects Research Laboratory
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NPS	National Park Service
ODU	Old Dominion University
ORCA	Office of Ocean Resources Conservation and Assessment
ORD	Office of Research and Development
QA/QC	Quality Assurance/Quality Control
TAMU	Texas A&M University
TOC	Total Organic Carbon
USEPA	United States Environmental Protection Agency
VER	Versar, Inc.
WWW	World Wide Web

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